

Review of SCE's Economic Evaluation Methodology for the Devers Palo Verde Line No.2 (DPV2)

Prepared for:

California Energy Commission

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Background

Consortium for Electric Reliability Technology Solutions/Electric Power Group (CERTS/EPG) have carried out the following studies for the California Energy Commission:

 Planning for California's Future Transmission Grid – Review of Transmission System, Strategic Benefits, Planning Issues and Policy Recommendations, October 2003.

 California Electricity Generation and Transmission Interconnection Needs Under Alternative Scenarios, November 2003.

 Economic Evaluation of Transmission Interconnection in a Restructured Market, June 2004.

 Review of CAISO's Economic Evaluation Methodology for the Devers Palo Verde Line No. 2, May 2005

Strategic Value of Transmission

Strategic benefits identified in CERTS/EPG report include:

- Price stability and decreased market power for existing generators.
- Potential for increased reserve sharing and firm capacity purchases.
- Insurance against contingencies during abnormal system conditions.
- Environmental benefits.
- Reduction in construction of additional infrastructure such as gas pipelines.

Scope of CERTS/EPG's Review of SCE's Economic Evaluation for Devers Palo Verde No. 2¹

- Review of SCE's Chapter 2 of DPV2 Proponent's Environmental Assessment filed April 5, 2005, covering purpose and need for this project
- Review of SCE's DPV2 Cost-Effectiveness Report prepared April 7, 2004 and its update, March 17, 2005
- Review of benefits included in SCE evaluation
- Review of additional benefits not quantified by SCE
- Impact of using a social rate of discount on benefit-to-cost ratio

¹ CERTS/EPG did not carryout any quantitative analysis to verify the magnitude of energy and other benefits reported in the SCE reports.

SCE's Objectives for Building DPV No. 2

- Increase California's access to low-cost energy from the Southwest
- Enhance competition among generating companies supplying energy to California
- Provide additional transmission infrastructure to support and provide an incentive for the development of future energy suppliers selling energy into the California market
- Provide increased reliability of supply, insurance value against extreme events, and flexibility in operating California's transmission grid

Economic Benefits Quantified by SCE for DPV2

➤ Energy Cost Savings

- Construction of DPV2 will decrease total energy production costs for electricity consumers in California.
- SCE's analysis shows that California energy prices will fall by about 2% with the addition of DPV2.
- This is the main component of economic benefits.

➤ Third Party Transmission Revenue

- Increased revenue to SCE from certain ETCs
- Increased CAISO wheeling through or out of the CAISO grid

Benefits for DPV2 Identified, But Not Quantified by SCE

- New Generation Development -- developing the DPV2 could attract new generation development east of Devers Substation
- Market Power – DPV2 may provide benefits by reducing the potential for generators to exercise market power
- Emergency Value – DPV2 could provide benefits during an emergency outage of a major import line and/or a large generating facility

The above benefits are not captured in SCE's production simulation modeling assessment used for evaluation of DPV2 project.

Other Non-Quantifiable Benefits for DPV2

SCE's evaluation does not mention all operational benefits, assumes there will be no capacity benefit, and SCE believes its estimate of transmission losses using a production simulation is inconclusive.

In contrast, CAISO has quantified the following benefits for DPV2:

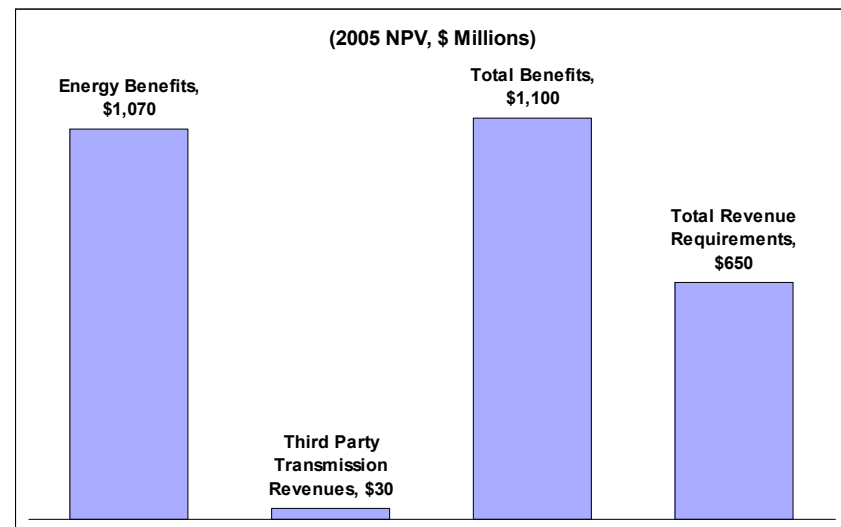
- *Operational Benefit* – savings not captured in the production simulation model – such as generation unit commitment costs, minimum load cost compensation, redispatch of units to address real-time congestion.
- *Capacity Benefit* – utilizing some of the surplus capacity in Arizona
- *Loss Savings* – reduction in transmission losses as a result of DPV2 operation, which were not captured in the DC Power Flow Model used by CAISO in the economic evaluation of DPV2
- *Emissions Reduction* – the emission reduction were not directly modeled in the production simulation model

In the CAISO evaluation, the above benefits are significant portion of the total benefits. For instance, in CAISO Ratepayer (LMP only) perspective 32% of the total benefits are attributed to the above benefits ⁽¹⁾

⁽¹⁾ Economic Evaluation of the DPV2 prepared by CAISO Department of Market Analysis and Grid Planning, Feb. 2005

DPV2 Projected Life Cycle Benefits

- SCE provides benefit-cost ratio for DPV2 in 2005 dollars
- It uses nominal 10.5% discount rate per annum
- The quantified benefits are:
Energy benefits (due to energy price reduction of around 2% due to operation of DPV2) and third party transmission revenues (around \$3.0 million/year)
- Based on SCE's evaluation, the B-C ratio for DPV2 is 1.7
- Energy benefits are based on production simulation for 2009-2015 and then escalated at GDP price index (around 2.28% per year)



WECC-Wide Benefit From DPV2

- At the request of CAISO, SCE has provided energy production cost for WECC for the years 2009 through 2014 with and without DPV2
- Net benefits for WECC (Real \$ 2004 in millions) is the difference between total production cost with and without DPV2:

	2009	2010	2011	2012	2013	2014
Net Benefits	11	21	21	21	26	25

- Assuming the net benefits remain at \$25 million after 2014⁽¹⁾, and a social discount rate of 5%, the NPV of energy benefits for WECC region for the period 2009-2055 will be \$435 million (in \$ 2005)
- Assuming an annual third party transmission revenue of \$3 million, the PV of this benefit using 5% discount rate will be \$55 million (in \$ 2005).

⁽¹⁾ Project benefits beyond 2014 hold at the 2014 level with a zero real growth for the remainder of the project's life (2015-2055) since we are using a social discount rate

Benefit-to-Cost Ratio for WECC Region and for CAISO Ratepayers Perspective (2005 \$ Million)

	WECC Region (Social Discount of 5%)	CAISO Ratepayers (Discount Rate of 10.5%)
Net Energy Benefits	435	1070
Third Party Transmission Revenue	55	30
Total Benefits	490	1100
Capital Cost ⁽¹⁾	650	650
Benefit-to-Cost Ratio	0.75	1.7


⁽¹⁾ Capital cost is \$680 million in nominal \$, which includes \$60 million AFUDC. Using GDP index and an assumed profile for annual capital expenditure, the Capital cost in 2005 \$ is estimated to be \$650 million.

Summary Results

- Based on the magnitude of the energy benefits calculated by SCE, the benefit-to-cost ratio of DPV2 is greater than 1.0 for CAISO ratepayers' perspective
- From the WECC regional perspective, using the numbers provided by SCE, and a 5% social discount rate, the quantified benefits from energy and third party transmission revenue are less than the project cost of (B-C ratio is less than 1.0).
- The WECC regional benefit is low, in part, because strategic values such as insurance value during abnormal system conditions, reduction in generators market power, potential for development of new generation outside of California, operational benefits, environmental benefits beside NOx reduction and finally decrease in California's need for additional infrastructures such as gas pipelines are not quantified in WECC regional benefit calculation.


Recommendations on Strategic Values of DPV2


A comprehensive assessment of WECC region-wide benefits and costs requires consideration of the following benefits, in addition to energy benefits:

 The capacity benefits and the interaction between transmission and generation expansion

 The insurance value of transmission expansion during abnormal system conditions

 The environmental benefits besides NOx reduction

 Impact on the need for additional infrastructures, such as gas pipelines

 The operational benefits, including increased operational flexibility due to transmission expansion

It is essential that a comprehensive B-C analysis consider all significant expected impacts of DPV2. Failure to consider some of the strategic benefits we have identified leads to an incomplete assessment of the B-C ratio for this project (in this case, suggesting that it would be less than 1)